

WHAT IS CLAIMED IS:

1. A microchip comprising:
 - at least one main channel formed in a channel forming medium, said main channel containing microfluids when in operation;
 - at least one detecting channel containing a first conductive element for performing electrochemical detection, said detecting channel being formed in said channel forming medium and adjoining said main channel; and
 - at least one reservoir containing a second conductive element for serving as a reference to said first conductive element, said reservoir being formed in said channel forming medium and containing waste when in operation.
2. The microchip of claim 1, wherein said detecting channel intersects said main channel.
3. The microchip of claim 1, wherein said detecting channel intersects said main channel at approximately a 90° angle.
4. The microchip of claim 1, wherein said detecting channel intersects said main channel at less than a 90° angle.
5. The microchip of claim 1, wherein said detecting channel intersects said main channel at greater than a 90° angle.
6. The microchip of claim 1, wherein said detecting channel intersects said main channel at an end point of said main channel.
7. The microchip of claim 1, wherein said channel forming medium comprises poly(dimethylsiloxane).
8. The microchip of claim 1, wherein said channel forming medium comprises poly(methylmethacrylate).

9. The microchip of claim 1, wherein at least one of said first conductive element and said second conductive element comprises gold.
10. The microchip of claim 1, wherein at least one of said first conductive element and said second conductive element comprises platinum.
11. The microchip of claim 1, wherein at least one of said first conductive element and said second conductive element comprises palladium.
12. The microchip of claim 1, wherein at least one of said first conductive element and said second conductive element comprises copper.
13. The microchip of claim 1, wherein at least one of said first conductive element and said second conductive element comprises nickel.
14. The microchip of claim 1, wherein at least one of said first conductive element and said second conductive element comprises nickel-alloy.
15. The microchip of claim 1, wherein at least one of said first conductive element and said second conductive element comprises carbon fiber.
16. The microchip of claim 1, wherein at least one of said first conductive element and said second conductive element comprises carbon paste.
17. The microchip of claim 1, wherein said at least one detecting channel comprises a plurality of detecting channels.
18. A method of forming a microchip comprising:
forming a main channel in a channel forming medium;
forming a detecting channel in a channel forming medium, wherein said detecting channel adjoins said main channel;

forming at least one reservoir in said channel forming medium, wherein said reservoir adjoins at least one of said main channel and said detecting channel;

placing a first conductive element in said detecting channel; and

placing a second conductive element in said reservoir to thereby form said microchip.

19. The method of claim 18, further comprising joining said channel forming medium with at least one sealing medium.

20. The method of claim 18, wherein said main channel, said detecting channel, and said reservoir are formed in said channel forming medium by molding.

21. The method of claim 18, wherein said detecting channel intersects said main channel.

22. The method of claim 18, wherein said detecting channel intersects said main channel at approximately a 90° angle.

23. The method of claim 18, wherein said detecting channel intersects said main channel at less than a 90° angle.

24. The method of claim 18, wherein said detecting channel intersects said main channel at greater than a 90° angle.

25. The method of claim 18, wherein said detecting channel intersects said main channel at an end point of said main channel.

26. The method of claim 18, wherein said channel forming medium comprises poly(dimethylsiloxane).

27. The method of claim 18, wherein said channel forming medium comprises poly(methylmethacrylate).

28. The method of claim 18, wherein at least one of said first conductive element and said second conductive element comprises gold.

29. The method of claim 18, wherein at least one of said first conductive element and said second conductive element comprises platinum.
30. The method of claim 18, wherein at least one of said first conductive element and said second conductive element comprises palladium.
31. The method of claim 18, wherein at least one of said first conductive element and said second conductive element comprises copper.
32. The method of claim 18, wherein at least one of said first conductive element and said second conductive element comprises nickel.
33. The method of claim 18, wherein at least one of said first conductive element and said second conductive element comprises nickel-alloy.
34. The method of claim 18, wherein at least one of said first conductive element and said second conductive element comprises carbon fiber.
35. The method of claim 18, wherein at least one of said first conductive element and said second conductive element comprises carbon paste.
36. The method of claim 18, wherein said at least one detecting channel comprises a plurality of detecting channels.
37. A method of performing electrophoresis comprising:
 - attaching at least a first conductive element and a second conductive element to a microchip having at least one biologic microfluid thereon, wherein said microchip comprises:
 - at least one main channel formed in a channel forming medium, said main channel containing at least one biologic microfluid;
 - at least one detecting channel containing said first conductive element for performing electrochemical detection, said detecting channel being formed in said channel forming medium and adjoining said main channel; and

at least one reservoir containing said second conductive element for serving as a reference to said first conductive element, said reservoir being formed in said channel forming medium and containing biologic waste; and

applying either continuous or pulsed amperometric detection to said microchip using said conductive elements to thereby cause biologic specimens within said biologic microfluid to migrate toward said first conductive element and, when in electrical contact with said first conductive element, to generate a measurable signal.

38. The method of claim 37, wherein said detecting channel intersects said main channel.

39. The method of claim 37, wherein said detecting channel intersects said main channel at approximately a 90° angle.

40. The method of claim 37, wherein said detecting channel intersects said main channel at less than a 90° angle.

41. The method of claim 37, wherein said detecting channel intersects said main channel at greater than a 90° angle.

42. The method of claim 37, wherein said detecting channel intersects said main channel at an end point of said main channel.

43. The method of claim 37, wherein said channel forming medium comprises poly(dimethylsiloxane).

44. The method of claim 37, wherein said channel forming medium comprises poly(methylmethacrylate).

45. The method of claim 37, wherein at least one of said first conductive element and said second conductive element comprises gold.

46. The method of claim 37, wherein at least one of said first conductive element and said second conductive element comprises platinum.

47. The method of claim 37, wherein at least one of said first conductive element and said second conductive element comprises palladium.

48. The method of claim 37, wherein at least one of said first conductive element and said second conductive element comprises copper.

49. The method of claim 37, wherein at least one of said first conductive element and said second conductive element comprises nickel.

50. The method of claim 37, wherein at least one of said first conductive element and said second conductive element comprises nickel-alloy.

51. The method of claim 37, wherein at least one of said first conductive element and said second conductive element comprises carbon fiber.

52. The method of claim 37, wherein at least one of said first conductive element and said second conductive element comprises carbon paste.

53. The method of claim 37, wherein said at least one detecting channel comprises a plurality of detecting channels.

54. The method of claim 37, wherein said biologic specimens comprise a carbohydrate.

55. The method of claim 37, wherein said biologic specimens comprise an amino acid.

56. The method of claim 37, wherein said biologic specimens comprise a protein.

57. The method of claim 37, wherein said biologic specimens comprise an antibiotic.

58. The method of claim 37, wherein said biologic specimens comprise levoglucosan.

59. The method of claim 37, wherein said biologic specimens comprise creatinine.

60. The method of claim 37, wherein said biologic specimens comprise creatine.

61. The method of claim 37, wherein said biologic specimens comprise uric acid.
62. The method of claim 37, wherein said biologic specimens comprise an amine.
63. The method of claim 37, wherein said biologic specimens comprise a thiol.
64. The method of claim 37, wherein said biologic specimens comprise an alcohol.
65. The method of claim 37, wherein said continuous or pulsed amperometric detection provides an electrical potential across said microchip to all for separation and detection of said at least one biologic microfluid.
66. The method of claim 65, wherein said electrical potential applied for separating the biologic specimens contained in said at least one biologic microfluid comprises approximately +100V to approximately +5000V.
67. The method of claim 65, wherein said electrical potential applied for separating the biologic specimens contained in said at least one biologic microfluid comprises approximately +800V to approximately +2000V.
68. The method of claim 65, wherein said electrical potential applied for separating the biologic specimens contained in said at least one biologic microfluid comprises approximately +1000V.
69. The method of claim 65, wherein said electrical potential applied for separating the biologic specimens contained in said at least one biologic microfluid comprises approximately +1700V.
70. The method of claim 65, wherein said electrical potential applied for detecting the biologic specimens contained in said at least one biologic microfluid comprises approximately +0.4V to approximately +1.0V.

71. The method of claim 65, wherein said electrical potential applied for detecting the biologic specimens contained in said at least one biologic microfluid comprises approximately +0.5V.

72. The method of claim 65, wherein said electrical potential applied for detecting the biologic specimens contained in said at least one biologic microfluid comprises approximately +0.7V.

73. The method of claim 37, further comprising injecting said biologic microfluid into a channel of said microchip at an electrical potential of approximately +100V to approximately +500V.

74. The method of claim 73, wherein the injecting step is performed for between approximately 1 second and approximately 1 minute.

75. The method of claim 73, wherein the injecting step is performed for approximately 7 seconds.

76. The method of claim 37, further comprising injecting said biologic microfluid into a channel of said microchip at an electrical potential of approximately +160V.

77. The method of claim 37, further comprising injecting said biologic microfluid into a channel of said microchip at an electrical potential of approximately +410V.

78. The method of claim 37, further providing, in combination with said at least one biologic microfluid, an electrolyte solution.

79. The method of claim 78, wherein said electrolyte solution comprises borate.

80. The method of claim 78, wherein said electrolyte solution comprises a pH of approximately 9 to approximately 13.

81. The method of claim 78, wherein said electrolyte solution comprises a pH of approximately 7.1.

82. The method of claim 78, wherein said electrolyte solution comprises a pH of approximately 9.45.

83. The method of claim 78, wherein said electrolyte solution comprises a pH of approximately 11.

84. The method of claim 78, wherein said electrolyte solution comprises a pH of approximately 12.